



**CH2MHILL**

*Celebrating  
50 Years*

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March 11, 1997

138120.A0.ZZ

Mr. Morris Flexner  
U.S Environmental Protection Agency  
Region IV  
Atlanta Federal Center  
100 Alabama Street, S.W.  
Atlanta, GA 30303-3104

Subject: January 27, 1997, Request For Information

Dear Mr. Flexner:

On behalf of the Business Council of Alabama and a coalition of companies interested in water quality in Alabama, I am herein submitting information in response to your January 27, 1997, Request for Information. In this request, you ask for any information related to whether 25 streams in Alabama currently attain, or have attained since 1975, the Fish and Wildlife (F&W) criteria in the Alabama Department of Environmental Management's (ADEM's) water quality standards. Our submission focuses on the following streams of interest to our membership:

- Valley Creek
- Village Creek
- Opossum Creek
- Five Mile Creek
- Chickasaw Creek
- The Lower Mobile River

As you are aware, ADEM currently is considering and processing stream upgrades, and updating the use attainability analyses (UAAs) for most of the 25 streams listed in the Request for Information. On the basis of our analysis and this status, we offer the following conclusions and comments regarding the potential for upgrading the six streams listed above:

- The attached report and videotape contain detailed data and information about the six streams of interest. This information strongly indicates that **these streams do not meet the Fish and Wildlife Standard** and have not met this Standard since 1975. This is despite substantially improved effluent from publicly owned treatment works (POTWs)

and privately owned discharges to these segments over this time frame. In the case of all of the streams, it appears that natural and historical man-made effects on the streams, including significant channelization and hydrologic modification, dominate the water quality in the streams. In addition, remedying these conditions would be technologically and economically infeasible. We thus conclude that the streams should not be upgraded to F&W.

- It is absolutely critical that EPA provide sufficient time for ADEM to complete the complex work required on the streams of interest. This work includes upgrading those streams that should be upgraded and preparing the UAAs for the rest. While we applaud EPA for its interest in the streams, it is wholly inappropriate for EPA to consider or pursue an upgrade of the streams without allowing ADEM and other entities to complete the work they have begun.
- We find that the time which we, the public, were given to prepare the response to the Request for Information was entirely insufficient to adequately prepare the information requested. Much of the data are present only in hard-copy format and must be prepared in such a format that sound scientific conclusions can be made. In many cases, data are not available at all and must be gathered, generally over several seasons, so that the data meet the requirements of EPA's regulations in this regard. After data are collected, the direct and indirect costs to those involved (public and private) must be calculated. In any case, several months are needed as a minimum to complete this effort. Our desire is for the EPA to have the best information and good science upon which to base a decision, and we strongly disagree that EPA can take the information gathered during the 30-day notice period and draw any significant conclusions.
- Business and industry are willing to assist and support ADEM and EPA in the proper and needed collection of data to complete the stream surveys and UAAs.
- Our initial analysis of the private and public sector costs required to comply with upgraded standards is that many millions of dollars would be required, with only a nominal increase in water quality; yet there would be no apparent assurance of maintaining a balanced, indigenous population in the streams.

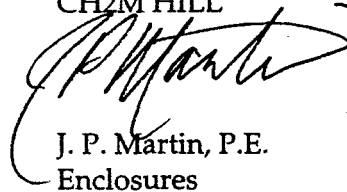
Over the last 25 years, business and industry have shown that they are willing to spend significant money to improve the waters of Alabama. There is concern, however, that these moneys be spent where there is the most value and where good science mandates it. We believe that much more work must be done before the analysis of upgrading the six streams listed above is complete; EPA should not circumvent the process begun by ADEM by drawing preliminary conclusions, and should allow ADEM to complete the UAAs. Alabama businesses would be happy to assist and participate in that process.

Mr. Morris Flexner  
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We appreciate the opportunity to make these comments on behalf of business and industry in Alabama. Should you have any questions, please feel free to call me.

Sincerely,

CH2M HILL

A handwritten signature in black ink, appearing to read "J. P. Martin", is written over the typed name and extends slightly to the left.

J. P. Martin, P.E.

Enclosures

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c: Business Council of Alabama  
Coalition Members  
James W. Warr/ADEM

# Water Quality Status Assessment

**Five Mile, Village, Opossum, Valley, and  
Chickasaw Creeks and the Lower Mobile River**

*Prepared for:*

**U.S. EPA Region IV  
Water Management Division**



**CH2MHILL**

Montgomery, Alabama  
March 1997 • 138,120.AO.ZZ

**Water Quality Status Assessment: Five Mile, Village, Opossum, Valley and Chickasaw  
Creeks, and the Lower Mobile River**

**Prepared for**

**U. S. EPA Region IV  
Water Management Division**

**Prepared by  
CH2M HILL, Inc.  
Montgomery, Alabama**

**March 1997  
138120.A0.ZZ**

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# 1. Introduction and Stream Overviews

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## Introduction

On January 27, 1997, the U.S. Environmental Protection Agency (EPA) issued a Request for Information (RfI) soliciting water quality and economic data for 25 streams in Alabama. The purpose of this request was to allow EPA to assess whether the Fish and Wildlife (F&W) criteria are being or have been attained in the 25 streams since 1975.

The Alabama Department of Environmental Management (ADEM) has been in the process of developing use-attainability analyses (UAAs), or is in the process of proposing upgrades for the majority of the 25 streams listed in the EPA RfI. Development of these UAAs requires a substantial amount of highly technical analyses of the streams, including economic, chemical, biological, and mathematical analyses. It is absolutely critical that EPA provide sufficient time for ADEM to complete the complex work required on the streams of interest. This includes upgrading those streams that should be upgraded and preparing the UAAs for the rest. While we applaud EPA for its interest in the streams, it is wholly inappropriate for EPA to consider or pursue an upgrade of the streams without allowing ADEM and other entities to complete the work they have begun.

In this regard, we find that the time period which we, the public, were given to prepare the response to the RfI to be entirely insufficient to completely prepare the information requested. We have prepared as much information as is feasible in the time provided, and, based on the evidence available at this time, are convinced that our conclusions are sound; however, a significant amount of supporting information is available, or should be gathered, to further support our conclusions. ADEM is in the process of completing this information gathering. Our desire is for the EPA to have the best information and good science upon which to base a decision to upgrade the streams and we strongly disagree that EPA can take the information gathered during the 30-day notice period and draw any significant conclusion that upgrading the classification of the streams in question is possible.

In response to the EPA's RfI, CH2M HILL was retained to perform a preliminary water quality assessment for six of the 25 streams:

- Village Creek in and near Birmingham
- Valley Creek in and near Birmingham
- Five Mile Creek in and near Birmingham
- Opossum Creek in and near Birmingham
- Chickasaw Creek near Mobile
- The Mobile River near Mobile from its mouth to Spanish River

Currently, Opossum Creek and a segment of Valley Creek are classified by the Alabama Department of Environmental Management (ADEM) at 335-6-11 as Industrial Operations (IO) streams. The remaining segments are classified as Agricultural and Industrial Water Supply (A&I).

In addition to the preliminary water quality review, economic impact information was gathered on several industries located on and using these streams. This report presents the results of both of these reviews.

## Stream Overviews

The four Birmingham streams and two Mobile streams, as groups, have similar characteristics and face similar technological and economic challenges in meeting the F&W criteria. A general description of these two areas follows. Additional detail on the streams is found in Section 2.

### Birmingham Area Streams

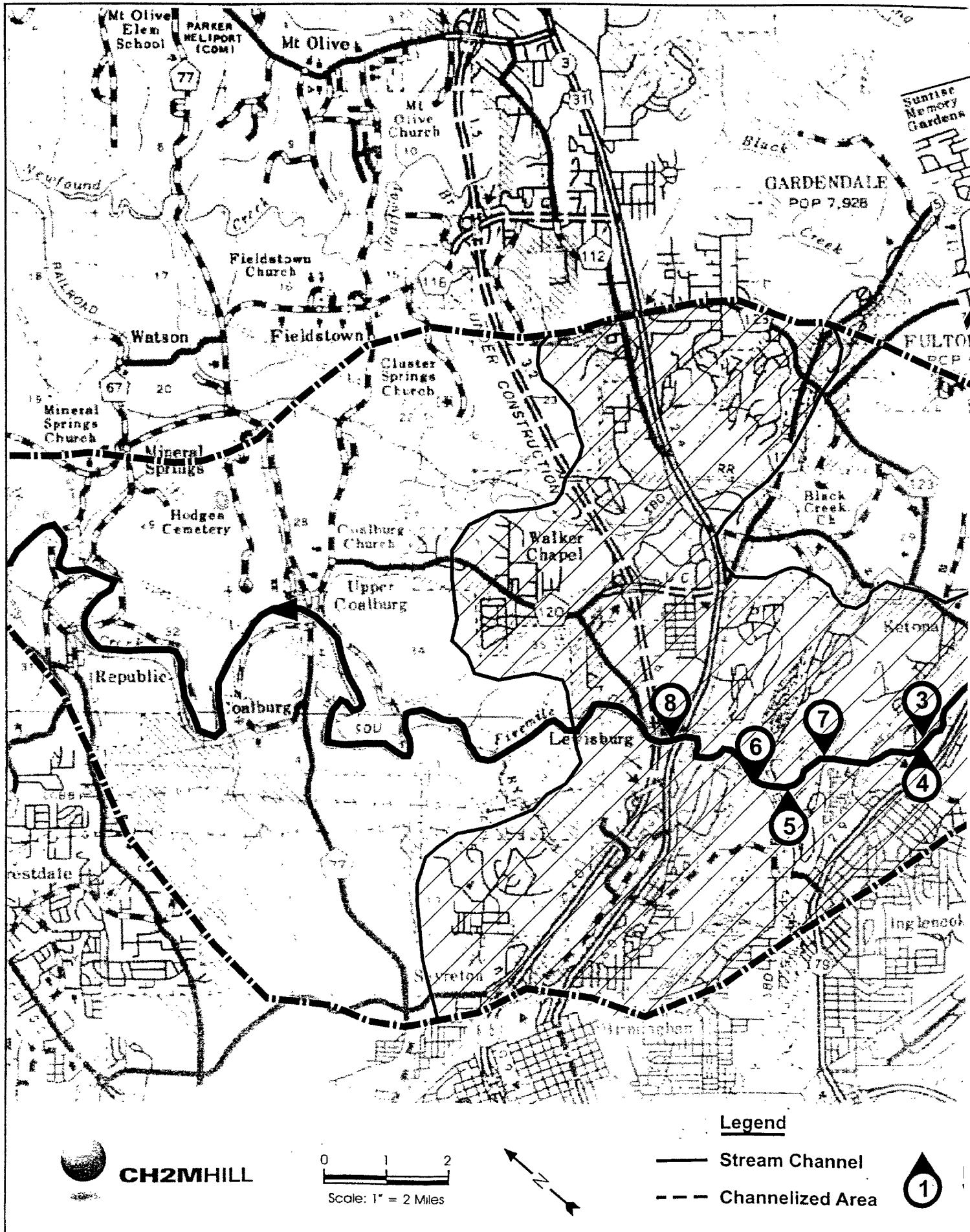
Improving water quality in the urban streams of Birmingham is a complex and difficult problem. The Alabama Water Commission document, *Water Quality Report to Congress for Calendar Year 1974*, listed the basins in Jefferson County as having the most significant water pollution problems in the state. The most heavily affected areas were on Village, Valley, and Five Mile Creeks because of the high amount of population and industrial activities in their watersheds. Another factor in the decline of these watersheds was the unfavorable low flow characteristics. The report states that during periods of low flow, the volume of water within these creeks was almost entirely effluent from municipal and industrial discharges.

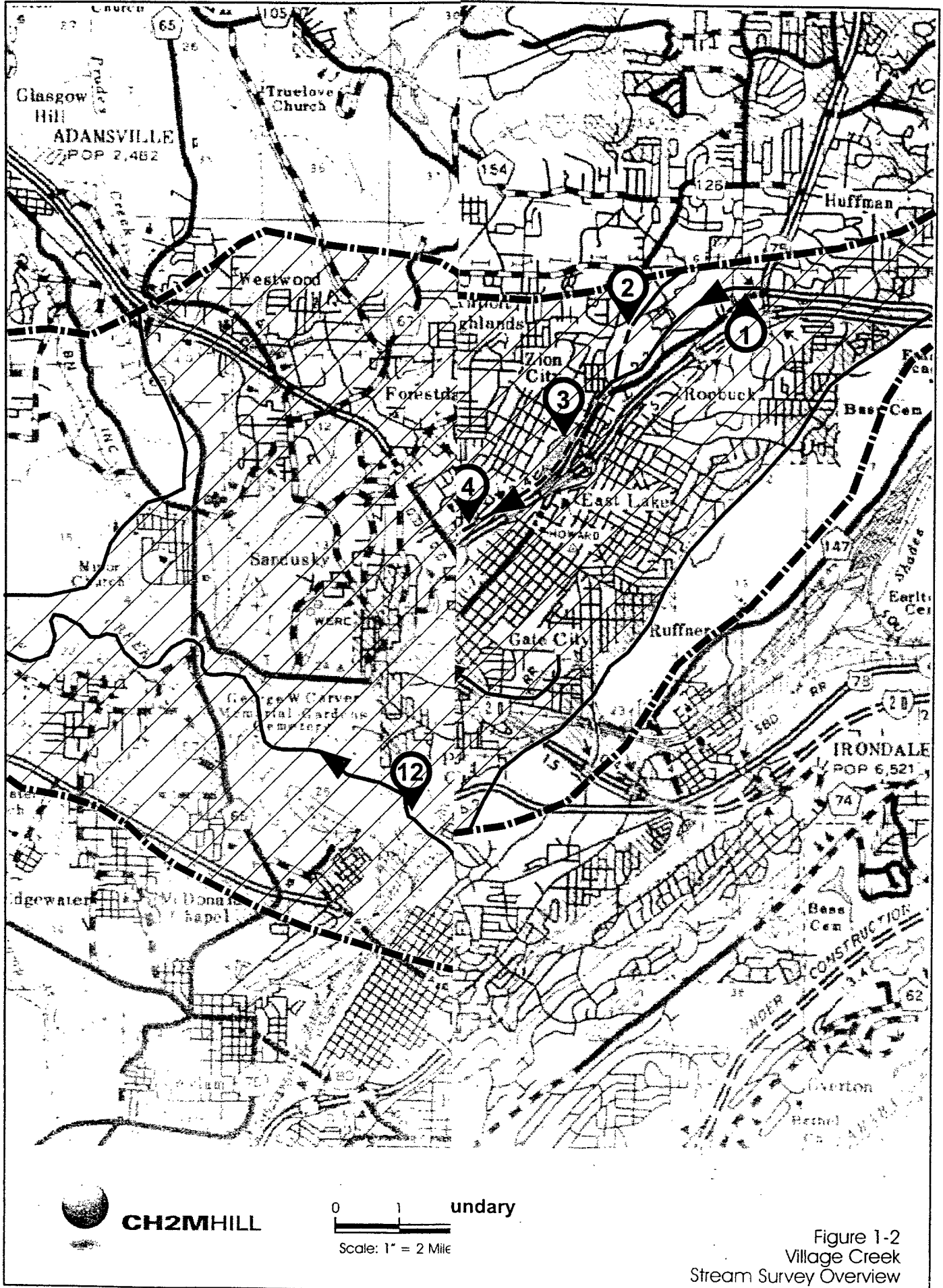
The four streams of interest in this report (Village, Valley, Five Mile, and Opossum Creeks) comprise all of the drainage area from the Greater Birmingham area west of Lookout Mountain and all of the major drainages to the Black Warrior River (see Figures 1-1 through 1-3). These figures also provide valuable insight into the streams by showing the drainage basins, urbanized and industrial areas within the basins, and channelized sections of the stream beds.

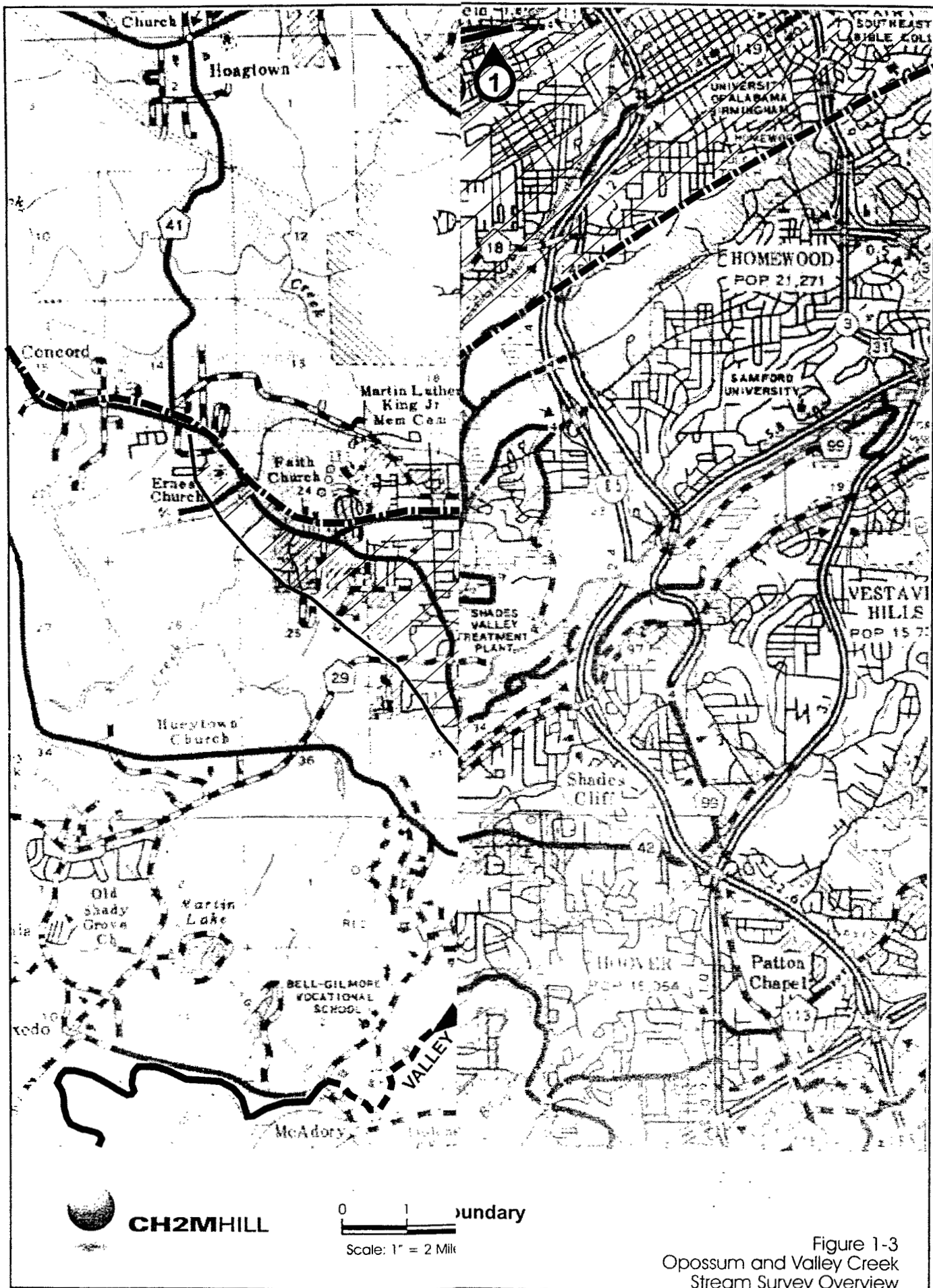
With a population of approximately 850,000 people in the greater metropolitan Birmingham area, a historically large, heavy industrial base, and limited water resources, effects on the streams in the area are significant. Inputs from municipal and industrial wastewater treatment plants are joined with a constantly increasing velocity and volume of urban storm water and non-point pollution sources.

The natural stream habitat has been altered by, in some cases, nearly a century of pre-regulation disposal practices in a highly industrial city. Because of the urbanization around the streams, large sections of all of the four major streams have been channelized for flood control to handle the ever-increasing volumes of storm water being contributed by increased runoff from the population boom in Jefferson County. The habitat for fish and invertebrate species has been severely altered by the sheer velocity and volume of storm water through the urban stream channels. The water quality is affected at low flow









conditions by municipal and industrial wastewater contributions and in high flow conditions with overflow from some sanitary sewer systems. In some cases, the streams recover to F&W conditions after flowing several miles.

In addition to the large inputs of storm water, all four of the streams originate in the urban areas in and around the City of Birmingham. The drainage areas for the streams are relatively small, which results in small base flow rates and low dilution of wastewater from municipal, industrial, and storm water runoff-induced flows. The combination of low base flows combined with the large storm water flows results in a large variation of flow rates in the streams. This condition limits the capability of the streams to attain a balanced, indigenous aquatic population. The low base flows, combined with natural and man-induced sources of organics and toxics, also limit the ability of the stream to meet the F&W dissolved oxygen (DO) and toxics standards.

The inability of Village Creek to meet the F&W standards is evidenced by its presence on ADEM's current 303(d) list. The 303(d) list includes streams that are not currently meeting their criteria (in this case, A&I). The 12.6-mile section from Jefferson County Road 65 to Woodlawn Bridge does not meet its criteria because of nonpriority organics, metals, ammonia, nutrients, pH, siltation, organic enrichment/DO, temperature, and flow alternations.

### **Mobile Area Streams**

Consistently attaining F&W status in Chickasaw Creek and the Lower Mobile River also is technologically and economically impracticable. These areas adjacent to Mobile Bay are characterized by poor flushing and water movement because of tidal effects and the many backwater areas around the upper bay and Mobile/Tensaw delta. Low DO concentrations are common during the high temperature, low flow summer months. These are due to these conditions combined with the degradation of natural organics from surrounding estuaries. In addition, the lower Mobile River/Chickasaw Creek area is characterized by a significant amount of navigation traffic and has many channelized segments in and leading to the area. The lower Mobile River, in particular, is maintained as a 55-foot-deep channel by the U.S. Army Corps of Engineers (COE) so that the shipping traffic can service the adjacent State Docks facility. This deep channel results in low flow and reoxygenation rates in the lower Mobile River, which produces low DO levels in that area.

## **2. Stream Evaluations**

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To respond to the EPA RFI, CH2M HILL performed a preliminary review of the physical habitat of the four major streams in the Birmingham area to assess whether the streams meet the conditions related to the F&W classification. The purpose of this review was to assess whether conditions were compatible with the F&W classification. The purpose of this review was to assess whether conditions were compatible with the F&W classification. In addition, historical documents, data, and applicable regulatory issues were reviewed relative to the Mobile streams. This section presents the results of the Birmingham and Mobile stream reviews.

### **Methods for Evaluating Stream Conditions**

Habitat plays an important role in the overall aquatic ecosystem and affects the types and numbers of species present in a particular body of water. Physical parameters affecting habitat include flow, temperature, water depth, velocity, substrate, aeration rates, and other factors. Through the habitat analysis, some of these physical factors were measured such as gradient/pools/riffles, sedimentation, channel modifications, channel stability, substrate composition and characteristics, sludge deposits, and riparian characteristics. Chemical and biological factors were not examined in the habitat analysis.

The aquatic habitats were evaluated using qualitative methods to record the physical characterization of the riparian zone, sediment and substrate, water quality, and aquatic habitat assessment. Each section of stream was scored on a scale from excellent-good-fair to poor rating. The scoring included the following parameters: local watershed erosion, local watershed non-point source, bank stability, bank vegetative stability, streamside cover, lower bank channel capacity, lower bank deposition, bottom scouring and deposition, bottom substrate available cover, embeddedness, depth of riffles and runs, depth of pools, low flow velocity, pool/riffle run/bend ratio, and aesthetics.

A videotape being submitted with this document further illustrates the conditions of the four Birmingham streams. Locations of the stations on the videotape correspond to the field descriptions found in each of the following stream description sections.

The field observations were taken in February 1997. Conditions during the reconnaissance were low flow conditions; no rain fell in the watersheds during the previous 5 to 7 days. The final day of field investigation videotaping included the results of overnight rainfall in Birmingham. One segment of the film was recorded July 27, 1994, after a 2.2-inch rainfall outside ABC Drummond near the dam on Five Mile Creek. Biological conditions of each stream segment were recorded, along with the degree of channelization and evidence of hydrologic modification. The qualitative results of the field surveys are incorporated into the stream description sections.

## Stream Conclusions

The following sections outline the data and conclusions for each of the streams of interest in this report.

### Five Mile Creek

The headwaters of Five Mile Creek begins in a residential community and light commercial area of Chalkville. Dry Creek, which drains similar land use, joins Five Mile Creek in the City of Birmingham just northeast of the intersection between Highway 75 and Old Springville Road. Drainage in this vicinity includes Centerpoint, which is highly developed with residential, commercial, and industrial sites. Five Mile Creek then heads southwest, entering Tarrant City, and runs along Pinson Valley Parkway, picking up drainage from commercial, and heavy industrial sites. The creek then heads west through Fultondale, where residential, light commercial, and industrial sites drain into the creek from the City of Birmingham, Fultondale, and Jefferson County. A dam crosses the stream at Drummond's ABC Coke Division's facility before Boyles Gap. Five Mile Creek heads northeast through rural and industrial areas, including strip mines, North Smithfield WWTP, and Five Mile Sewage Treatment Plant. The creek then flows through Brookside in low-density residential, light commercial, and industrial areas. The final stretch of Five Mile Creek picks up drainage from the McDonald Hollow Landfill through Prudes Creek, passes through rural areas scattered with strip mines, and empties into Locust Fork approximately 2 miles west of Highway 78.

The Jefferson County Storm Water Office's NPDES documents designate the stream effects as moderate for nutrients, siltation, organic enrichment/DO, and pathogens. The sources of the impacts are listed as irrigated crop production, surface mining, mine tailings, and onsite wastewater systems such as septic.

Permitted individual NPDES dischargers in the watershed are Jefferson County Five Mile Creek WWTP, ABC Coke Division of Drummond, Sloss Industries, and Allworth Inc.

### Fish and Wildlife Water Quality Criteria Not Attainable

Conditions related to best usage for the F&W classification are waters suited for fish, aquatic life, and wildlife propagation. For the A&I classification, best usage was waters suitable for agricultural irrigation, livestock watering, industrial cooling, and fish survival.

Five Mile Creek has a long history of industrial uses. The history of channelization, flooding, and sewage overflows is not compatible with habitat suitable to support fish, aquatic life, or wildlife propagation. It also believed that sections of Five Mile Creek do not meet the numeric criteria for DO, toxics, and turbidity.

A brief review of water quality data obtained through Storet confirms periods of low DO and turbidity not meeting the ADEM standards for the F&W classification.

### Applicable Criteria Demonstrating that Fish and Wildlife Criteria Are Not Attainable

The criteria listed in 40 CFR part 131.10(g) that apply to this segment of Five Mile Creek are the following:

- Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use.
  - ⇒ Channelization for flood control has altered the natural contours of the stream. Also, at least one dam (at ABC Coke Division) is known to exist. No feasible remediation exists for these conditions due to current flooding conditions.
- Physical conditions related to the natural features of the water body, such as lack of a proper substrate, cover, flow, depth, pools, riffles and the like unrelated to water quality, preclude attainment of aquatic life protection uses.
  - ⇒ Because of the intense velocity and volume of storm water runoff through Five Mile Creek during storms, the habitat for fish and invertebrates is drastically altered with each event. Some sections are scoured to bedrock conditions; other sections show signs of constant substrate alterations and bar formations creating unstable conditions for fish habitat.
- Controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread economic and social effects.
  - ⇒ As described below, costs of compliance with the F&W standard are excessive.

### Applicable Criteria Demonstrating that Fish and Wildlife Criteria Are Not Attainable

**Observed Stream Conditions.** Five Mile Creek originates in Chalkville and flows west through central Jefferson County. As with the other urban streams in Birmingham, flooding has been a historical problem. Flooding in January and March of 1996 flooded many residences along the creek (*Birmingham News*, February 1997). The cause of the increasing flooding problem probably is the development boom in Centerpoint and Pinson. The bridge at Brookside west of Birmingham on Five Mile Creek has recently been replaced to allow an increased velocity of water through the former bottle neck area. The upper reaches of the creek are characterized by residential development, with commercial development beginning around the Bessemer Superhighway. West of Ketona, industrial discharge contribution to the stream flow begins. Downstream from Birmingham, strip mine drainage and forestry practices contribute to water quality changes.

The aquatic habitat for Five Mile Creek was rated "good" to "fair" in the section from Ketona to I-65. Water quality and urban effects were obvious along the channel. Overall habitat quality was rated low because of the lower bank deposition, bottom scouring, lack of bottom substrate and available cover, lack of good riffles and pools, unstable habitat because of regularly occurring high velocity flooding, and non-point sources.



The numbers listed below refer to locations along Five Mile Creek from Ketona to the bridge at I-65 and Highway 31. A videotape of each of these locations was made during the brief field reconnaissance to aid in reviewing the current stream conditions. Comments were noted on water quality appearance, available aquatic habitat, and surrounding land use. No quantitative data were recorded because of the limited time available during the comment period. Please follow along in the videotape at each of the stations listed below:

1. Highway 79 and Pinehill Road (124) light industrial land use begins in this segment; commercial land use.
2. Highway 79 near Ketona, same station as 1 after February 27, 1997, storm, with turbid storm water contributions.
3. Springdale Road west of Pinson Valley Parkway, south of small town of Danville, heavy industrial contributions begin.
4. Springdale Road, same station as 3 after February 27, 1997, storm.
5. Boyles Yard, near railroad bridge at Boyles Gap, heavily industrial, Aquatic habitat: fair, slightly turbid, heavy industrial land use.
6. Industry outfall, high volume of industrial discharges.
7. Two-inch storm, recorded July 27, 1994, at ABC Coke Division dam. Major stream constriction at dam site. Aquatic migration limited by dam height.
8. Hwy. 31 and Interstate 65 bridges, Aquatic habitat: fair, clear water, industrial land use.
9. Hwy. 31 and Interstate 65 bridges after February 27 storm.

### **Compliance Cost Estimate**

There are approximately five known individual NPDES permit holders discharging to Five Mile Creek. These include a major municipal WWTP and coke, chemical, steel, and allied industry manufacturers.

ADEM has calculated approximate limits required by these dischargers should they have to meet the F&W criteria. These limitations would require substantial reductions in nitrogen, BOD, metals, and organics for dischargers in Five Mile Creek. A compliance cost estimate was prepared for two of the coke and chemicals dischargers into Five Mile Creek. For one facility, substantial reductions in nitrogen, BOD, organics, and cyanide would be required to meet the F&W limitations. A capital cost of \$8,000,000 and annualized expenditures of more than \$10,000,000 would be required to meet the F&W limitations. For the other facility, less substantial reductions in nitrogen, BOD, organics, and cyanide would be required to meet the F&W limitations. A capital cost of \$5,000,000 and annualized expenditures of \$1,000,000 would be required to meet the F&W limitations. The financial effect on the two entities could not be calculated with certainty; however, the costs could be expected to affect the viability or, as a minimum, competitiveness of the operation.



In the case of the second facility, capital would have to be diverted from production-related projects to wastewater treatment. It is anticipated that, without the invested capital, one coke battery would have to be shut down. That would result in a loss of 110 jobs, and a loss of \$4,400,000 per year in direct salaries, and an additional \$30,800,000 per year in indirect losses to the community. Over a 10-year period from 2000 to 2010, approximately \$352,000,000 would be lost to the community. These effects constitute both substantial financial impacts to the industry and widespread impacts in the community. On the basis of the degree of effluent reduction required to meet the F&W standard, it is anticipated that similar results would be obtained for the other major dischargers in this segment.

## **Village Creek**

### **Description of Waterbody**

The headwaters to Village Creek begin in dense residential and commercial areas within the City of Birmingham near Eastlake Park. The creek flows west underneath the Birmingham Municipal Airport and picks up drainage from highly residential, commercial, and numerous industrial sites along the railway system, including the Village Creek Wastewater Treatment Plant (WWTP). Portions of the channel have been straightened through Roebuck Golf Course and the Birmingham Airport. The creek flows out of Birmingham into residential and rural communities of Jefferson County, with strip mines sparsely located throughout the watershed. Village Creek empties into Bayview Lake, along with several other tributaries from Adamsville, Maytown, and Birmingham. The tributary from Mulga drains into Village Creek just down from Bayview Lake, then Village Creek heads north, picking up drainage from rural communities, strip mines, and mills until it flows into Locust Fork near West Jefferson.

Moderate sources of impact on Village Creek listed in the Jefferson County Storm Water National Pollutant Discharge Elimination System (NPDES) application are nonpriority organics, metals, ammonia, nutrients, pH, siltation, organic enrichment/DO, flow alteration, pathogens, and oil and grease. Jefferson County lists the sources of impact as moderate from feedlots, surface mining, subsurface mining, mill tailings, and mine tailings. High sources of impact include storm sewers, surface runoff, and onsite wastewater systems such as septic tanks.

Village Creek currently is being studied along with Five Mile Creek, Valley Creek, and Opossum Creek by the Mobile COE for water quality and flood control. In the past, sections of Village Creek have been channelized and dredged for flood control management. During heavy rains, residents complain of sewage overflows and storm water overflowing the creek channel into homes and public areas.

Dye studies by ADEM in a cave near East Lake showed the dye emerging in the headwaters of Village Creek near the Boys' Industrial School. Numerous septic tanks on the mountain south of Village Creek are thought to contribute to the headwater flow. The nature of the limestone bedrock under Village Creek allows the migration of various types of discharges in the watershed to enter the stream channel through underground connections.

Permitted individual NPDES dischargers to Village Creek are the Jefferson County Village Creek WWTP, Allied Signal, American Cast Iron Pipe, Ashland Chemical Company, Birmingham Steel Corporation, Celotex Corporation, Chemas, Exxon, Groundwater Technology, Industrial Chemicals, Sloss Industries, SMI Steel, and Stockham Valve and Fittings.

### **Fish and Wildlife Water Quality Criteria Not Attainable**

Conditions related to best usage for the F&W classification are waters suited for fish, aquatic life, and wildlife propagation. For the A&I classification, best usage was waters suitable for agricultural irrigation, livestock watering, industrial cooling, and fish survival. Village Creek has a long history of industrial uses. The history of channelization, flooding, and sewage overflows is not compatible with habitat suitable to support fish, aquatic life, or wildlife propagation. It also is believed that numeric criteria for DO, toxics, and turbidity are not attainable.

### **Applicable Criteria Demonstrating that Fish and Wildlife Criteria are not Attainable**

40 *Code of Federal Regulations* (CFR) part 131.10(g) lists the criteria applicable to demonstrating, through a use-attainability analysis (UAA), that a stream is not required to meet the F&W criteria. The criteria that apply to this segment of Village Creek and the reasons why they are applicable include the following:

- Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.
  - ⇒ Sewage overflow, septic tank inputs, and abandoned iron ore mines leaking into the stream channel contribute to the poor water quality.
- Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use.
  - ⇒ Channelization for flood control has altered the natural contours of the stream.
- Physical conditions related to the natural features of the water body, such as lack of a proper substrate, cover, flow, depth, pools, riffles and the like unrelated to water quality, preclude attainment of aquatic life protection uses.
  - ⇒ Because of the intense velocity and volume of storm water runoff through Village Creek during storms, the habitat for fish and invertebrates is drastically altered with each event. Some sections are scoured to bed rock conditions; other sections show signs of constant substrate alterations and bar formations creating unstable conditions for fish habitat.

- Controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread economic and social effect.

⇒ As described below, costs of compliance with the F&W standard are excessive.

### **Rationale Demonstrating Why F&W is Not Attainable**

The Ensley Moro Park South Pratt Flood Victims Coalition stated that Village Creek exceeded its bank capacity five times within 6 months starting in October 1996. Storm water runoff adds to the water quality and quantity problems. With continued construction activities in the watershed, increased man-made impervious surfaces create high volumes and velocities of storm water in the Village Creek channel. The top bank channel flooding can be assessed by the height of the garbage in the trees and shrubs around the stream channel.

The aquatic habitat for Village Creek was rated "fair" from the headwaters to the WWTP. Overall habitat quality was rated lower because of the lack of bottom substrate, available cover, lack of good riffles and pools, and unstable habitat due to regularly occurring high velocity flooding. Various segments of Village Creek have been channelized over the years, allowing the flood flows to gain velocity and to further degrade the stream habitat.

**Observed Stream Conditions.** The numbers that follow refer to locations along Village Creek from the headwaters near Huffman to the Village Creek WWTP. A videotape of each of these locations was made during the brief field reconnaissance to aid in reviewing the current stream conditions. Comments were noted on water quality appearance, available aquatic habitat, and surrounding land use. No quantitative data were recorded because of the limited time available during the comment period.

Please follow along in the videotape at each of the stations listed below:

1. Headwaters near Huffman; Aquatic habitat: fair, clear water, oil sheen, residential land use.
2. Roebuck Golf Course, headwaters flow joined by southern tributary; Aquatic habitat: fair, clear water, residential, golf course.
3. 84th Street bridge above East Lake Park; Channelized parallel to park, residential land use.
4. 5th Avenue North and 43rd Street N, main channel east of the Birmingham Airport; Aquatic habitat: fair, slightly turbid water, sewage odor, residential land use. Highly channelized to well below Highway 79.
5. 15th Avenue North and 50th Street North, southern tributary to Village Creek, east of Birmingham Airport; Aquatic habitat: fair, clear water, industrial/residential land use.
6. 15th Avenue North and 50th Street North, after February 27 storm; High velocity, turbidity.

7. Tallapoosa Street, west of Airport after February 27 storm ; Channelized, concrete reinforced section, high velocity, significant increase in velocity and volume after airport.
8. Vanderbilt Road crossing.
9. 29th Street crossing.
10. East of I-65, 24 Street bridge; Aquatic habitat: fair, slightly turbid, industrialized land use.
11. Avenue V; Aquatic habitat: fair, opaque water, residential/commercial land use.
12. Village Creek WWTP; Poor substrate for habitat, excessive litter.

### **Compliance Cost Estimate**

There are approximately 13 known individual NPDES permit holders discharging to Village Creek. These include a major municipal wastewater treatment plant (WWTP), steel manufacturers, foundries, and chemical companies. ADEM has calculated approximate limits required by these dischargers should they have to meet the F&W criteria. These limitations would require metals limitations of less than 1 part per million (ppm) for lead and copper. A compliance cost estimate was prepared for one of the foundry dischargers on this stream. On the basis of a flow of 750,000 gallons per day (gpd), a capital cost of \$2,000,000 and annualized expenditures of \$350,000 would be required to meet the F&W limitations. The financial effect on the entity could not be calculated with certainty; however, the effect would increase capital and annual costs significantly for this company, and potentially affect its competitiveness in the highly competitive foundry market.

## **Opossum Creek**

### **Description**

The headwaters of Opossum Creek begin in the City of Fairfield near Englewood School. This 6-mile-long stream follows the railway east of Fairfield Steel until it empties into Valley Creek in Jefferson County just west of Hueytown. The watershed drains dense residential, commercial, and heavy industrial parts of Midfield, Hueytown, Brighton, and Bessemer.

The Jefferson County NPDES permit application states that the causes of high impact and impairment are unknown toxicity and pH. Moderate levels of impact include pesticides, priority organics, nonpriority organics, metals, pathogens, and oil and grease. There is high degree of runoff from storm sewers and combined sewers. Construction for highways, roads, bridges, and land development are a moderate source of impact. Mine tailings, mill tailings, and landfills also pose a high impact potential.

Permitted individual NPDES dischargers to Opossum Creek are Avondale Mills, Airco Industrial Gases, Hanna Steel, Koppers Industries, Inc., Koppers Woodward Coke, Polymer Coil Coasters, and USX Fairfield Works.

### **Fish and Wildlife Water Quality Criteria Not Attainable**

Conditions related to best usage for F&W classification are waters suited for fish, aquatic life, and wildlife propagation. For the A&I classification, best usage was waters suitable for agricultural irrigation, livestock watering, industrial cooling, and fish survival. Opossum Creek has a long history of industrial uses. The history of channelization, flooding, and sewage overflows is not compatible with habitat suitable to support fish, aquatic life, or wildlife propagation.

A brief review of water quality data obtained through Storet indicates periods of low DO below the standards for the F&W classification.

### **Applicable Criteria Demonstrating that F&W Criteria Are Not Attainable**

The criteria listed in 40 CFR part 131.10(g) that apply to this segment of Opossum Creek include the following:

- Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.
  - ⇒ Sewage overflow, septic tank inputs, and abandoned iron ore mines leaking into the stream channel contribute to the poor water quality. Because of economic conditions in these areas, no feasible remediation exists.
- Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use.
  - ⇒ Channelization for flood control has altered the natural contours of the stream. No feasible remediation exists for these conditions due to current flooding conditions.
- Physical conditions related to the natural features of the water body, such as lack of a proper substrate, cover, flow, depth, pools, riffles and the like unrelated to water quality, preclude attainment of aquatic life protection uses.
  - ⇒ Because of the intense velocity and volume of storm water runoff through Opossum Creek during storms, the habitat for fish and invertebrates is drastically altered with each event. Some sections are scoured to bedrock conditions; other sections show signs of constant substrate alterations and bar formations, creating unstable conditions for fish habitat.
- Controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread economic and social effects.
  - ⇒ As described below, costs of compliance with the F&W standard are excessive.

### **Applicable Criteria Demonstrating that Fish and Wildlife Criteria Are Not Attainable**

**Observed Stream Conditions.** The Opossum Creek headwaters have been obscured as urbanization and industrial use have altered the flow direction and volume in Opossum Creek. After the stream crosses under I-65, most of the surrounding land use is heavy industrial. The channel has been straightened and retains little of its natural character. Although urban flooding is not a problem, the channelization has removed most of the natural habitat. The stream from headwaters in near Ensley Park to the confluence with Valley Creek was rated "fair" for habitat. The lower rating was because of non-point sources, lower bank depositions, unavailable bottom substrate cover, lack of embeddedness, lack of good pools and riffles, and poor aesthetics.

Please follow along in the videotape at each of the stations listed below:

- O-1. Headwaters near Ensley Park, urban, residential, concrete channels.
- O-2. Fairfield section, residential, trash in stream, channelized.
- O-3. Allison-Bonnett Drive Aquatic habitat: fair, turbid water, sewage and chemical odors, fish present, heavy industrial land use, channelized.
- O-4. Rutledge Drive, near I-65 and Valley Parkway, north of contribution on Little Creek to Opossum Creek, channelized, poor substrate.
- O-5. Woodward Street, Aquatic habitat: fair, turbid water, sheen, petroleum odors, heavy industrial land use.
- O-6. Woodward Street after February 27, 1997, storm.

### **Compliance Cost Estimate**

There are approximately five known individual NPDES-permitted dischargers into Opossum Creek, including a large steel mill, a steel manufacturer, and a coke/chemicals company.

ADEM has calculated approximate limits required by these dischargers should they have to meet the F&W criteria in Opossum Creek. These limitations would require substantial reductions in nitrogen, BOD, metals, and organics for these dischargers. A compliance cost estimate was prepared for the coke/chemicals discharger on Opossum Creek. For this facility, substantial reductions in nitrogen, BOD, organics, and cyanide would be required to meet the F&W limitations. A capital cost of \$1,750,000 and annualized expenditures of \$4,000,000 would be required to meet the F&W limitations. The financial effect on the entity could not be calculated with certainty; however, the costs could be expected to affect the viability or, as a minimum, competitiveness of the operation. On the basis of the degree of effluent reduction required to meet the F&W standard, it is anticipated that similar results would be obtained for the other major dischargers in this segment.

## Valley Creek

### Description of Waterbody

The headwaters of Valley Creek are under a heavily developed industrial and commercial area of downtown Birmingham. Mine drainage from Red Mountain, as well as other non-point source contributions, are thought to enter the headwaters of the stream.

The creek flows to the southwest through the densely developed areas of Birmingham, Midfield, and Brighton, and into Bessemer. Industrial sites in Bessemer include a mining quarry, Valley Creek WWTP and sludge disposal facility, and other industries that discharge storm water runoff into the creek. After the Valley WWTP, the creek flows through forested areas with strip mine and forestry activities. Valley Creek joins the Black Warrior River at the Miller Generating Plant. The stream receives a large amount of urban runoff and storm sewer contributions. The stream has been channelized in some places, and some of the riparian vegetation has been removed. The Jefferson County Storm Water NPDES permit application rates the following chemical effects as high for Valley Creek: unknown toxicity, pesticides, nonpriority organics, nutrients, siltation, and organic enrichment/DO. Moderate effects include flow alteration, other habitat alterations, pathogens, and oil and grease.

Permitted individual NPDES dischargers into Valley Creek include Birmingham Hide and Tallow, Kerr McGee Refining, and Shell Oil.

### Fish and Wildlife Water Quality Criteria Not Attainable

Conditions related to best usage for F&W classification are waters suited for fish, aquatic life, and wildlife propagation. For A&I classification, best usage was waters suitable for agricultural irrigation, livestock watering, industrial cooling, and fish survival.

Valley Creek has a long history of industrial uses. The history of channelization, flooding, and sewage overflows is not compatible with habitat suitable to support fish, aquatic life, or wildlife propagation.

A brief review of water quality data obtained through Storet indicates several instances of turbidity not meeting the ADEM standards for the F&W classification.

### Applicable Criteria Demonstrating That Fish and Wildlife Criteria Are Not Attainable

40 CFR part 131.10(g) lists the criteria applicable to demonstrating, through a UAA, that a stream is not required to meet the F&W criteria. The criteria listed in this section that apply to this segment of Valley Creek include the following:

- Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.
  - ⇒ Sewage overflow, septic tank inputs, and abandoned iron ore mines leaking into the stream channel contribute to the poor water quality. Due to economic conditions in these areas, no feasible remediation exists for these conditions.

- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use.
  - ⇒ Channelization for flood control has altered the natural contours of the stream. Again, no economically feasible remediation exists, particularly because of current flooding conditions.
- Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles and the like unrelated to water quality, preclude attainment of aquatic life protection uses.
  - ⇒ Because of the intense velocity and volume of storm water runoff through Valley Creek during storms, the habitat for fish and invertebrates is drastically altered with each event. Some sections are scoured to bed rock conditions; other sections show signs of constant substrate alterations and bar formations, creating unstable conditions for fish habitat.
- Controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread economic and social effects.
  - ⇒ As described below, costs of compliance with the F&W standard are excessive.

#### **Applicable Criteria Demonstrating that Fish and Wildlife Criteria Are Not Attainable**

**Observed Stream Conditions.** Valley Creek has been channelized for flood control. Significant parts of the channel have been straightened and, in some places, culverts have been constructed.

Valley Creek originally began as a spring in Opossum Valley of north Birmingham. The headwaters area has been covered with city streets. The water that comes out of the two huge culverts under 7th Street North contains drainage from under the city, as well as mine drainage from Red Mountain. In the headwaters, the stream is channelized and trash hangs from the trees and shrubs. Trash is common in the trees and shrubs the entire urban length of the stream. Sewage overflow problems persist as in Village Creek. Increased man-made impervious surfaces create high volumes and velocities of storm water in the channel. The top bank channel flooding can be assessed by the height of the garbage in the trees and shrubs around the stream channel.

The aquatic habitat for Valley Creek was rated "fair" from the headwaters to the 19th Street bridge. Water quality and urban effects were obvious along the channel. Overall habitat quality was generally low because of the lack of bottom substrate, available cover, bottom scouring and deposition, lack of good riffles and pools, unstable habitat due to regularly occurring high velocity flooding, and lack of stream aesthetics. Various segments of Valley Creek have been channelized over the years, allowing the flood flows to gain velocity and to further degrade the stream habitat.



The numbers listed below refer to locations along Valley Creek from the headwaters in downtown Birmingham to the channelized section near the 19th Street bridge. A videotape of each of these locations was made during the brief field reconnaissance to aid in reviewing the current stream conditions. Comments were noted on water quality appearance, available aquatic habitat, and surrounding land use. No quantitative data were recorded because of the limited time available during the comment period. Please follow along in the videotape at each of the stations listed below:

1. Headwaters 7th Street North and 5th Avenue North; excessive litter, chemical odors, channelized; urban commercial/industrial land use.
2. Fayette Avenue and Madison Avenue (18th Avenue SW), near fairgrounds in Ensley; Aquatic habitat: fair, residential/commercial, partly open canopy, slightly turbid, trash on banks.
3. Brighton Road, stoneroller fish and rat in stream, channelized, urban commercial/industrial land use.
4. Bessemer Road (U.S. 11); Aquatic habitat: fair, light industrial, partly open canopy, slight petroleum odor, slightly turbid, industrial land use.
5. 18th Avenue crossing, commercial/urban residential, litter in trees, missing pool and backwater habitat, altered hydrology.
6. 19th Street bridge Aquatic habitat: fair, channel is deeper, slightly turbid and wider, channelized, fish present, residential/commercial land use, probably COE flood control construction to widen and straighten the channel

### Compliance Cost Estimate

There are approximately four known individual NPDES-permitted dischargers into Valley Creek, including a rendering plant, petroleum bulk terminals, and a large municipal WWTP. In addition, there are several additional dischargers to Opossum Creek, which enters the upper reaches of Valley Creek, which would be affected by the upgrade. These include a large steel mill and a coke/chemicals company.

ADEM has calculated approximate limits required by these dischargers should they have to meet the F&W (or A&I in part of Valley Creek) criteria. These limitations would require substantial reductions in nitrogen, biochemical oxygen demand (BOD), metals, and organics for dischargers in both Valley Creek and Opossum Creek. A compliance cost estimate was prepared for the coke/chemicals discharger on Opossum Creek. For this facility, substantial reductions in nitrogen, BOD, organics, and cyanide would be required to meet the F&W limitations. A capital cost of \$1,750,000 and annualized expenditures of \$4,000,000 would be required to meet the F&W limitations. The financial effect on the entity could not be calculated with certainty; however, the costs could be expected to affect the viability or, as a minimum, competitiveness of the operation. On the basis of the degree of effluent reduction required to meet F&W, it is anticipated that similar results would be obtained for the other major dischargers in this segment.

## Chickasaw Creek

### Description of Waterbody

Chickasaw Creek enters the Mobile River slightly north of the Mobile's confluence with Mobile Bay. A number of bayous and backwater areas enter the creek, including Hog Bayou, Shell Bayou, and Black Bayou. The tidal effects from the bay are known to extend as far as the U.S. Highway 43 bridge. Significant point and non-point sources of pollution are known to exist.

Natural conditions strongly influence the quality in Chickasaw Creek. Because of the tidal effects, flushing is poor in the creek and reaeration of the creek water is low. Benthic oxygen demand is very high in the creek as a result of the historical usage and nature of the estuarine conditions. Temperatures also are high as a result of the shallow estuarine conditions. The presence of a wedge of salt water reduces the mixing between the shallow fresh water and the deep salt water. This tends to reduce the DO in the fresh water layer and in the deeper salt layer, which is heavily affected by the sediment oxygen demand.

The historical usage of Chickasaw Creek includes heavy use by navigation entities, and the creek includes many shipping-related businesses along its banks. The water quality in Chickasaw Creek has historically been poor as a result of the natural conditions present.

EPA has recognized the special conditions existing around Mobile Bay and has designated the Bay to participate in the National Estuary Program. This program, funded and sponsored by EPA, is currently in its formative stages. The program will work with ADEM to coordinate improving water quality in the sensitive areas in and around Mobile Bay, including Chickasaw Creek.

### Fish and Wildlife Water Quality Criteria Not Attainable

Conditions related to best usage for the F&W classification are waters suited for fish, aquatic life, and wildlife propagation. For the A&I classification, best usage was waters suitable for agricultural irrigation, livestock watering, industrial cooling, and fish survival.

Chickasaw Creek has a long history of industrial uses. The history of channelization and the natural conditions are not compatible with habitat suitable to support fish, aquatic life, or wildlife propagation. In addition, modeling indicates that the F&W DO criterion is not feasible in this area, even with removal of the point source discharges to the creek.

### Applicable Criteria Demonstrating that Fish and Wildlife Criteria Are Not Attainable

40 CFR part 131.10(g) lists the criteria applicable to demonstrating, through a UAA, that a stream is not required to meet the F&W criteria. The criteria listed in this section that apply to this segment of Village Creek include the following:

- Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.
  - ⇒ Natural conditions coupled with channelization and navigation effects and historical benthic oxygen demand preclude attaining the F&W standard. No feasible remediation is available for this condition.

- Controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread economic and social effects.

⇒ As described below, costs of compliance with the F&W standard are excessive.

### Stream Conditions

The Mobile Area Water Quality Management (208) Plan, prepared by the South Alabama Regional Planning Commission in 1979, provides the only available predictive information on the potential for attaining the F&W standard in Chickasaw Creek and surrounding streams. This study included extensive dynamic modeling of the area streams for DO impacts. The study made the two following important conclusions:

- The Mobile River and Chickasaw Creek systems are highly interconnected as a result of the tidal action in the area. For example, increased loads to the Mobile River near the mouth of Chickasaw Creek result in decreased water quality in Chickasaw Creek.
- Upgrading the treatment levels of the Chickasaw Creek dischargers under several scenarios failed to meet DO standards in the Creek.
- Even if all dischargers are removed from Chickasaw Creek, it is possible that the creek would still only meet the DO criteria associated with the A&I classification (4.0 milligrams per liter [mg/L]).

These results validate the conclusion that meeting F&W standards in Chickasaw Creek would be difficult as a result of natural conditions.

### Compliance Costs

There are approximately nine known individual NPDES-permitted dischargers into Chickasaw Creek, including a refinery, chemicals manufacturers, petroleum handling facilities, power generation facilities, and navigation facilities. ADEM has calculated approximate limits for toxics required by these dischargers should they have to meet the F&W criteria. ADEM has not calculated limitations associated with ammonia and BOD because of an inability to use the model used in the 208 Plan. Meeting the F&W limitations would require significantly tighter metals limitations for two of the facilities on the creek. Preliminary compliance cost estimates were prepared by these manufacturers. Wastewater treatment costs were substantial. The financial effect on the entity could not be calculated with certainty; however, the impact would greatly increase capital and annual costs, and could potentially affect their competitiveness.

Cost effects as a result of meeting the limitations required to meet the F&W DO standard could not be determined because ADEM could not rerun the model; however, based on the degree of effluent reduction required to meet the F&W standards for the metals, it is anticipated that similar significant affects results would be realized for the dischargers in this segment affected by the DO modeling.

## Lower Mobile River

### Description of Waterbody

The Lower Mobile River enters Mobile Bay near downtown Mobile. This area is characterized by a very wide and deep (approximately 55-foot) channel maintained by the COE to permit ocean-going ship traffic to the ports along the river, including the State Docks' facilities in this segment of river.

Natural conditions strongly influence the quality in the Lower Mobile River. As with Chickasaw Creek, the presence of a wedge of salt water reduces the mixing between the shallow fresh water and the deep salt water. This tends to reduce the DO in the fresh water layer and in the deeper salt layer, which is heavily affected by the sediment oxygen demand. In addition, the deep channel results in lower stream flow, and hence, reaeration, and increases the hydraulic detention time and stratification. These human-caused conditions thus reduce the natural capacity of the river to assimilate the natural and man-made oxygen-demanding sources to the river and result in lower DO levels there.

### Fish and Wildlife Water Quality Criteria Not Attainable

Conditions related to best usage for the F&W classification are waters suited for fish, aquatic life, and wildlife propagation. For the A&I classification, best usage is waters suitable for agricultural irrigation, livestock watering, industrial cooling, and fish survival.

The Lower Mobile River has a long history of industrial uses. The history of channelization and the natural conditions are not compatible with habitat suitable to support fish, aquatic life, or wildlife propagation. In addition, recent data indicate that the F&W DO criterion is not feasible in this area, as a result of the channelized and natural conditions present in the river.

### Applicable Criteria Demonstrating that Fish and Wildlife Criteria Are Not Attainable

40 CFR part 131.10(g) lists the criteria applicable to demonstrating, through a UAA, that a stream is not required to meet the F&W criteria. The criteria listed in this section that apply to this segment of Village Creek include the following:

- Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.
  - ⇒ Natural conditions coupled with channelization and navigation effects preclude attaining the F&W standard. No feasible remediation is available for this condition.
- Controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread economic and social effect.
  - ⇒ As described below, costs of compliance with the F&W standard are excessive.

### Stream Conditions

The Mobile Area Water Quality Management (208) Plan, prepared by the South Alabama Regional Planning Commission in 1979, provides the only available predictive information on the potential for attaining the F&W standard in the Lower Mobile River. This study included extensive dynamic modeling of the area streams for DO effects. The study made the two following important conclusions:

- The Mobile River and Chickasaw Creek systems are highly interconnected as a result of the tidal action in the area. For example, increased loads to the Mobile River near the mouth of Chickasaw Creek result in decreased water quality in Chickasaw Creek.
- Even with all dischargers entering the Mobile River and meeting BPT standards (as is the case now), the DO criteria associated with the F&W criterion could not be met; the A&I DO criterion (4.0 mg/L) could be met.

In addition, several years of DO data collected by the two pulp and paper dischargers obtained on the Lower Mobile River were reviewed. This analysis indicates that the river cannot consistently meet an in-stream DO concentration of 5.0 mg/L during a relatively normal flow and temperature year, and may meet the A&I DO standard of 4.0 mg/L in a low flow, high temperature year. This is believed to be caused largely by oxygen demand from natural and/or background sources to the river. The effect is exacerbated by the very deep channel, which reduces the flow rate and natural reaeration in the river and increases the hydraulic retention time in the system.

These results validate the conclusion that meeting the F&W standards in the Lower Mobile River would be difficult because of natural conditions present there.

EPA has recognized the special conditions existing around Mobile Bay and has designated the Bay to participate in the National Estuary Program. This program, funded and sponsored by EPA, is currently in its formative stages. The program will work with ADEM to coordinate improving water quality in the sensitive areas in and around Mobile Bay, including the Lower Mobile River.

### Compliance Costs

There are two known individual NPDES-permitted dischargers into the Lower Mobile River. These are two pulp and paper manufacturing facilities. ADEM has not been able to calculate effluent limitations to achieve an F&W criterion because of an inability to use the model used in the 208 Plan. It is expected, however, that meeting the F&W limitations would require significantly tighter BOD and nitrogen limitations for two of the facilities on the river. Thus, the financial effect on the entities could not be calculated with certainty; however, the impacts are believed to be substantial, given that both facilities are currently treating to a level in excess of the BPT effluent guidelines.